

# CONTINUOUS IMPROVEMENT PROJECT DATABASE

## DIVISION 10 PROJECTS

Project Name	Project Description	Division	Project Year	Contact Name	Contact Number	Project Category
Mulching Plant Beds	<p>Division 10 has 55 acres of plant bed area that are maintained by the state. Approximately one-third of this area needs to be mulched annually to keep it presentable. Division 10 needs 21,780 cubic yards of mulching material for 18 acres. A tractor trailer can bring 100 cubic yards of mulch in a single delivery at a cost of \$900 per load. 218 loads would be needed to achieve this level at a cost of \$192,200.</p> <p>Division 10 acquired a mulching material through Triangle Brick in Wadesboro. They have a hardwood mulching materials that is used in their brick process. They do not use all of the hardwood mulch which means that leftover mulch is a waste product for them.</p> <p>This past year, approximately 4,000 cubic yards of mulch from Triangle Brick has been hauled, at no cost to the state. This resulted in a savings of about \$36,000 worth of mulch that Division 10 will not have to purchase.</p>	Div 10	2009	Tim Simpson	(704) 982-1028	Dollar Savings
Clear Savings on Windshields	<p>: Several years ago we noticed that we were replacing more and more windshields due to road hazards. We decided to see if we could get a company to come around to state locations and repair windshields before they started cracking. We began research and shopping around for the best cost, good quality repairs, and a company that would be able to drive to all DOT sites in our area. In 2008 we rescued 34 windshields from being replaced and saved approximately \$8,000.</p>	Div 10	2009	Robert Waterhouse	(704) 596-2131	Dollar Savings
Repotting of Bare Root Forestry	<p>In late winter, early Spring 2008, one of our maintenance units went out and disturbed a quarter acre of land that had been reforested with loblolly pines. The land owner requested that we replant this area in loblollies again. I contacted the Forestry Service to find some trees and they advised me to call their Goldsboro office and try to get some of the throwaways. I later learned that they cleaned out the coolers in May. The Forestry Service was agreeable to us coming and getting their throwaways.</p> <p>In May 2008, we sent a flatbed to Goldsboro, primarily to get loblolly pines but also to get whatever they had in the coolers that were to be thrown away. Our guys came back with 100 white ash, 200 black cherry, 200 pin oaks, 100 locusts, 100 button bush 250 loblolly pine, 500 long leaf pine, 1000 white pine, 500 Virginia pine, 100 rebuds, 200 dogwoods and 200 shumard oaks.</p> <p>The nursery was able to pot up all of these trees and, so far, we have been able to plant the loblollies back for the landowner. We are preparing a bed at the Welcome Center on I-77 and will use a lot of the rebuds and dogwoods at this location, with the rest being planted at the I-85 and I-485 interchange in the coming weeks. Some of the other pines and oaks will need another year of growth before using them, but they will offer up good trees in ensuing years at no cost to the taxpayers. The estimated value currently on all of the obtained trees in 2008 is \$35,000. This is a growing asset for the state, the plants that we do not wish to use this year will be a larger plant in future years, ergo a more valuable asset to the state when it is planted along state right of way. We plan to continue this program and will pursue obtaining more trees this spring for planting in the future.</p>	Div 10	2009	Tim Simpson	(704) 982-1028	Dollar Savings
Earthwork Computation Spreadsheet	<p>The problem was reflected in the time and training required to compute earthwork volume for estimated and final quantities to be paid on construction projects.</p> <p>A spreadsheet was created to enable anyone to enter data from x-section notes or plotted areas. Entry does not require any special training and can be used by anyone. It is helpful in establishing estimated quantities of earthwork throughout a project as well as computing exact final quantities.</p> <p>The user is able to enter as much or as little information as warranted to obtain results at any stage of the project. If estimated quantities are needed and it is known that earthwork will continue in the same area, it may not be necessary to use all shots taken. The spreadsheet can be updated to produce the exact quantities as the need arises. This improvement enables tracking of earthwork quantities paid and generates a source document for final quantities</p>	Div 10	2009	Hilda Beck		Labor Hour Savings

Straw Blowing Procedures	<p>During the straw blowing operations, operators were required to stand on the rear of a slick flat bed truck to feed bales of straw into the blower. No means was provided to prevent the employee from falling off and under the wheels of the straw blower being pulled behind.</p> <p>The solution was to build an approved handrail system that would help prevent someone from falling off the truck if they slipped. The blower chute on the blower was also modified to hydraulically raise and lower to clear the handrail system as needed to turn and cross uneven terrain.</p> <p>The handrail system provides a much safer workstation for employees to perform the straw blowing operation. The equipment is safer and user-friendly.</p>	Div 10	2009	Rick Mabry	(704) 596 2131	Safety Improvement
NCDOT-IMAP Training Ground	<p>There was no unified training for the IMAP drivers. Each IMAP unit trained differently and there was no internal communication. People were still making common errors that could lead to injury or even death. Quick Clearance was a new idea to the state and had not been integrated into any training regiments.</p> <p>Build a training facility where responders could receive actual training on incidents encountered in the field. This training facility could reach beyond NCDOT and other first responding agencies. The facility would also provide NCDOT the ability to video record the different training practices and to create a training film library that could be shared with other IMAP units, other NCDOT units, Contractors, and first responding agencies.</p>	Div 10	2009	Tim Kirk	(704) 982-0101	Safety Improvement
Video system on Centerline Paint Machine	<p>Division 10 Traffic Services received a new centerline paint truck in early 2008. The new truck is considerably larger than the previous truck and striping narrow, secondary roads is more difficult due to the size of the truck. The operator had to lean out the window of the new truck to see and this put the operator at risk for being hit by oncoming traffic, debris, etc.</p> <p>The solution had to include keeping a sealed cab. A video system with the camera mounted underneath the truck allowed maximum visibility. A monitor was also mounted inside the cab for the operator.</p> <p>The video system eliminated obstructions because it was placed under the truck for optimal viewing. Another benefit of this modification is the safety of the operator because he/she can stay inside the cab of the truck. This video system can be used by each and every paint crew across the state.</p>	Div 10	2009	Donald Griffith	(704) 982-1998	Safety Improvement
GIS Maps for Projects	<p>Problem: Not being able to effectively communicate with ease to the different units, the public, contractors, and fellow co-workers about highway projects is an ongoing problem. Many times projects are discussed without all of the involved parties understanding what is being said. In NCDOT the projects consist of some kind of alteration to the surface of land. In doing this people want to know what is the impact. It may involve a new road, resurfacing an exiting road, utilities, drainage, landscaping, buildings, and many other items. Illustrating the concept from one person to another can become very complicated without visual aids</p> <p>Solution: The solution is a phrase most people have used many times, a picture is worth a thousand words. We used a local GIS (geographical information system) to create maps in a digital format or a hard copy. The GIS consist of many layers of data that included aerial photo maps, contour lines, roads, property lines and owners, CADD drawings, utilities, boundaries of counties, and cities, along with various other layers.</p> <p>Results: NCDOT representatives and employees can have help in illustrating the intent or purpose involving a project with visual aids, maps.</p>	Div 10	2008	Barrett Eatman	(704)-982-0101	Communications
Vibratory Plate Tamps	<p>Problem: Many of our small dump trucks tied up pulling patch rollers and not available for other operations.</p> <p>Solution: At the yearly equipment buy, I requested plate tamps for each of the patch crews. Each crew was assigned a tamp and used for most potholes.</p> <p>Results: Having 5 fulltime patch crews we used to have 5 small dump trucks tied up with patching and paving operations. Since implementing the vibratory plate tamps only 2 crews need the use of rollers and dump trucks to transport them. The full depth patch crew and the paving crew still need the lager rollers, but the trucks are also used for these operations to transport material. 3 small dumps are now available to be sent on other operations. After evaluating the plate tamps we were also able to reduce our roller and trailer compliment by 2 each.</p>	Div 10 / Union Maintenance	2008	David Gillette	(704) 283-5941	Labor Hour Savings

One Man Patcher	<p><b>Problem:</b> In 2004 after a heavy snow season followed by an unusually wet spring, the roads in the county were in very poor condition with many potholes. We had 5 patch crews working 6 days a week and could not keep up with the potholes.</p> <p><b>Solution:</b> We rented a patch truck made by Rossco from Interstate Equipment Co. The machine patches using tar and gravel and is self contained on a 33,000 GVW truck. This operation requires only one employee to operate, and one inmate to stop traffic if the patcher is around a curve or down a hill in a blind spot. The patcher approaches a hole, blows out loose material with compressed air then fills it with a combination of tar and No. 78 stone. On an average hole the process takes about 30 seconds to complete.</p> <p><b>Results:</b> This single truck (1 TW and 1 inmate) are able to patch on average 50 to 100 (140 has been max) holes a day. This operation is able to fill more holes than all 5 patch crews combined. Each conventional patch crew consisted of 1 TSI, 2 TW, 2 inmates, 1 crewcab dump, 1 tar kettle, 1 roller, 1 roller trailer. This patch truck not only helped to get the potholes under control but also has allowed us to spend less time on response and more time on preventative maintenance</p>	Div 10 / Union Maintenance	2008	David Gillette	(704) 283-5941	Safety Improvement
Tare & Gravel Vs. Cold Patch	<p><b>Problem:</b> When crews could not get asphalt from the plant they were using cold patch material to patch potholes. The cold patch material is very expensive – over double that of regular asphalt.</p> <p><b>Solution:</b> To minimize the amount of cold patch material used we went back to the old method of hand patching with tar and gravel. The cold patch material is now only used if plant mix is unavailable and conditions will not allow the use of tar and gravel.</p> <p><b>Results:</b> Tar and gravel is readily available on the yard and the least expensive material to use. Under proper conditions and if applied correctly the tar and gravel application provides as good a patch as any product. Utilizing this method of patching has cut our use of the more expensive cold patch material by 80 percent</p>	Div 10 / Union Maintenance	2008	David Gillette	(704) 283-5941	Safety Improvement
Daily Crew Assignments	<p>Lack of communication between Supervisors and clerks, wrong information on FR1101's (ex. Wrong WBS, function codes, MMS task numbers, etc. I would have FR11's with incomplete work orders on it, not enough information on job sites, no MMS numbers, incorrect task numbers, and employees checked in on the board, but out of work.</p> <p><b>Solution:</b> I created a spreadsheet in excel with all of the employees on it with special blocks for each Supervisor/CrewLeader. I created spaces for the Supervisor's to write down the employees with each Supervisor, their WBS elements, their function codes, their mms task numbers, their job sites. At the bottom of each sheet, I have all employees names with lines so they can check them if they're here or write out if they are not</p> <p><b>Results:</b> This sheet if filled out daily, corrects 99% of the mistakes that I find on daily FR11's and helps me tremendously. If I am missing an employee, I can check on this sheet to see if they are with someone (in case they were left off of FR11 by mistake) or if they are out of work, etc. Also if the WBS element is wrong on FR11, I can check this sheet to see if numbers were omitted, if it was the right WBS element they were given or if the WBS was erroneously left off. If someone calls in and needs to know where a Crew is working, I can check this sheet to see what road they are working on and what Supervisor they are working with and get up with them quicker. IT SAVES me lots of time and makes my documents that I enter have FEWER errors (or incorrect information)!</p>	Div. 10, District 3, Anson Maintenance	2008	Tim Boland	(704)-982-0101	Communications
Office Assistant III Position Description Manual	<p><b>Problem:</b> In the past, this position has remained vacant for months at a time. Since this Office Assistant III provides services to the DDC Department, the Safety Department, and the Moving Ahead Department, a vacancy in this position causes hardship to whomever is required to perform those duties. A good deal of the duties performed by this Office Assistant III are not the same as the duties performed by the other Administrative Assistants in the Division office.</p> <p><b>Solution:</b> A detailed and organized manual was written, printed out, and also stored on the hard drive for use by whomever is filling in for this assistant during an absence or between permanent employees.</p>	Division 10 DDC	2008	Cindy Iorlano	(704)-982-0101	Customer Service

Cutting 3/8" and 5/16" Grade 80 Chain with Torch	<p><b>Problem:</b> When cutting 3/8" and 5/16" grade 80 chain, we were having the shop to bring torch to the back of the parts department, pull out chain, measure and have technician cut when needed. Often flammable materials had to be cleared from the area before using this torch.</p> <p><b>Solution:</b> After the purchase of our electric chain cutter, we save time by cutting chain ourselves. Also, it is safer than using a torch.</p> <p><b>Results:</b> The results of this new process are a safer and faster way to fill chain orders.</p>	Division 10 Equipment	2008	Ricky R. Mabry	(704)-596-2131	Safety Improvement
Electronic Programmable Thermostats	<p><b>Problem:</b> Energy was wasted because manual thermostats were being used to control roughly 3,000 sf of office space. Unless someone physically changed the settings every morning and evening, the climate control system was running all night and weekend as if the building was occupied.</p> <p><b>Solution:</b> Install electronic thermostats that can be programmed for time of day and day of week to minimize energy use.</p> <p><b>Results:</b> Energy is saved by controlling the climate in an appropriate fashion. Time is also saved because this solution requires little daily intervention from our staff.</p>	Division 10 Office	2008	Tim Boland	(704)-982-0101	Energy and Environment
Salt Spreader Stands	<p><b>Problem:</b> Division 10 Bituminous unit had 5 of our salt spreaders sitting on concrete barriers wall. Our operation for loading and unloading salt spreaders is to use the bridge department boom truck or use a front-end loader. An employee has to climb up the concrete barriers to get on top of the salt spreader unit. Once on top of the spreader, the employee hooks the four-legged chain. Then the employee has to climb down off of the spreaders using the concrete barrier as a stepping stool. After this operation is completed, the boom truck operator or loader operator takes control of the operation. There are two ground guides and a spotter; the spotter directs the truck operator to back up slowly. The two guides are holding onto the spreader, where it will not hit the ground or the back of the truck. As the truck is backing up, the operator slowly lowers the spreader into place. Once in place, the guides make sure that the spreader can be locked into place. Then the operator finishes lowering the spreader into the truck bed. Then employee climbs back onto the top of the spreader, and unlatches the chains from the spreader.</p> <p><b>Solution:</b> Division 10 Bituminous purchased 5 Swenson leg stands at a cost of \$2,495 each from Carolina Industrial Equipment</p> <p>These stands have reduced the number of needed personnel, eases the workload on the crew, eliminates overhead hazards, prevents slips, falls and pinch points and frees up personnel. These stands provide for combined labor hour savings and safety improvement</p>	Division 10 Roadoil Department	2008	Chip Speight	(704)-982-0714	Safety Improvement
Cutting 3/8" and 5/16" Grade 80 Chain with Torch	<p><b>Problem:</b> When cutting 3/8" and 5/16" grade 80 chain, we were having the shop to bring torch to the back of the parts department, pull out chain, measure and have technician cut when needed. Often flammable materials had to be cleared from the area before using this torch.</p> <p><b>Solution:</b> After the purchase of our electric chain cutter, we save time by cutting chain ourselves. Also, it is safer than using a torch.</p> <p><b>Results:</b> The results of this new process are a safer and faster way to fill chain orders.</p>	Division 10 Equipment	2008	Ricky R. Mabry	(704)-596-2131	Safety Improvement

Tailgate Removal Hammer	<p><b>Problem:</b> The Division Safety Committee developed the Tailgate Removal Procedures (submitted for an Award) to aid in the removal of tailgates from the back of Dump Trucks. Upon the removal of the tailgate, the Dump Trucks would be equipped with spreaders so the employees could apply salt, sand, and brine to the roadways during inclement weather. Injuries were occurring during the removal of the tailgates such as finger, hand incidents and one incident including a blow to the head of one employee.</p> <p><b>Solution:</b> The removal procedures were developed. In these procedures, a pin-removal and a Plastic Dead Blow Hammer were made to aid in the removal process. These hammers (fiberglass) were distributed to each location that was removing tailgates to place spreaders in the back of Dump Trucks.</p> <p><b>Results:</b> The hammers assisted in removing these tailgates off the back of Dump Trucks to place the spreaders on for inclement weather. Consequently, the employees would not need to use their hands to remove pins from the tailgate</p>	Div 10	2007	Darla H. Burris	(704) 982-0101	Safety Improvement
Flip Sign Safety Latches	<p><b>Problem:</b> During events at Lowe's Motor Speedway, numerous ground mounted signs need to be changed to indicate which lanes are open and which lanes are closed. This is achieved with the use of flip signs. A flip sign is a sign that is cut in the middle and a hinge is installed allowing the sign face to be opened and closed. Personnel had to exit the vehicle and manually move a lever to flip a sign either up or down to inform the traveling public of a traffic control change during a race event. This resulted in personnel either walking around or standing atop one of the sign trucks within traffic control that was being changed or implemented. There are many distractions to drivers within race traffic including advertising, alcohol, scantily clad people, roadside sales, roadside parking, pedestrians weaving in and out of traffic, tour busses, the traffic control itself (counterflow and work barrels), etc.</p> <p><b>Solution:</b> Design a flip sign latch that was spring loaded so that personnel could quickly deploy or store traffic control information signs with a pole type tool that would activate the mechanism from inside the safety of a sign truck and keep traffic control convoy moving steadily.</p> <p><b>Results:</b> Safety is improved by allowing the sign erector to remain inside the vehicle while flipping signs. Previously NCDOT personnel would have to exit the vehicle and physically change the sign from the inbound to outbound pattern.</p>	Division 10 Traffic Services	2007	Donald Griffith	(704)-982-1998	Safety Improvement
Mobile Column Lifts	<p><b>Problem:</b> Much of the work performed in the Albemarle Shop is related to preventative maintenance. This requires vehicles to be raised for all service and brake inspections. This work was being performed with floor jacks and jack stands. Also, technicians had to work while lying on creepers on the floor.</p> <p><b>Solution:</b> Due to the completion of a new facility at the Albemarle Shop we now have enough ceiling height to install a lift system. The type chosen was a mobile column lift. This allows lifts to be utilized in any of the seven (7) open bays.</p> <p><b>Results:</b> Faster and safe lifting of equipment. We are now able to work standing under trucks. No longer need to lie on creepers under equipment. Much safer and more productive.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Labor Hour Savings
Aluminum Tailgates on Trash Trucks	<p><b>Problem:</b> Newell Maintenance has two flat bed trucks equipped to pick up and dispose of trash from the highway. These trucks were originally built with wood lift tailgates. They were heavy and hard to lift and store while dumping the load. Also, the wood was easily damaged if gates were dropped to the ground.</p> <p><b>Solution:</b> The Charlotte Shop designed, constructed, and installed new aluminum tailgates for the back of these trash trucks. The gates and holders have provided the employees easy access to the bed of the truck without having to strain with heavy wooden gates. Cables were attached between the gates and the truck bed to allow the gates to hang on the side of the body while the load is dumped. This prevents loss and damage to the gates. Sheeting for these gates was cut from used aluminum sign materials.</p> <p><b>Results:</b> This has reduced the chance for injuries, i.e., back strains and hand injuries.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Safety Improvement

Lube Bay Lighting	<p><b>Problem:</b> When vehicles were raised on the lifts for service, the lights were blocked causing poor lighting while under the unit.</p> <p><b>Solution:</b> The Charlotte Shop designed and constructed a way to add light under a piece of equipment while changing the oil. This was achieved by adding lights on the walls about four feet from the floor.</p> <p><b>Results:</b> This made it safer for employees to perform their duties with less risk of injury and eyestrain.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Safety Improvement
Propane Bottle Lift Sling and Storage	<p><b>Problem:</b> Equipment in the shop for repairs sometimes has propane bottles attached. If the bottles are full they sometimes will leak propane through the relief valve due to expansion from being in the heated shop area. Also welding maybe performed on/or in the area of the tanks. For safety reasons propane bottles must be removed from equipment in for repairs. The large bottles are too heavy to be handled by hand. The cap ring at the top of the bottle can not be used for lifting.</p> <p><b>Solution:</b> The Charlotte Shop designed and constructed a new way to remove and store large propane cylinders while equipment is being services. Bottles are removed/installed with the overhead crane and stored outside in holders away from fire sources. The lifting strap is approved for lifting propane bottles.</p> <p><b>Results:</b> This reduces the risk of fire inside the shop and helps prevent back injuries.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Safety Improvement
Shop Lift Attachment Holders	<p><b>Problem:</b> The Charlotte Shop has several lifts designed to raise vehicles for service. The lifts use attachments to adapt the lift to different trucks and were always lying around on the floor causing trip and lifting hazards.</p> <p><b>Solution:</b> The Charlotte Shop designed, constructed, and installed holders for the lift attachments. The holders provide employees easy access to the attachments without having to bend all the way to the floor or under a bench.</p> <p><b>Results:</b> This has reduced the chance for injuries including back strain and trip hazards.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Safety Improvement
Small Tire Changer	<p><b>Problem:</b> The Charlotte Tire Shop was having problems with tire repairs on small tires, i.e., the type on lawn mowers and other small equipment.</p> <p><b>Solution:</b> The Charlotte Shop designed and constructed a way to replace and/or repair small tires in a safer manner. This was achieved by attaching the small tire changer to an old rim, which is securely clamped in the larger tire-changing machine.</p> <p><b>Results:</b> This puts the small changer in a better working area and puts less strain on employee's back. While working up off the floor, there is less chance of slipping and less risk of injury.</p>	Division 10 Equipment	2007	Ricky R. Mabry	(704)-596-2131	Safety Improvement
Secondary Construction Right of way	<p><b>Problem:</b> In the past, we would survey a road, draw plans, and send to right of way unit for R/W acquisition. After performing all of this work, property owners at times express their wishes to keep the road unpaved. If property owners do not dedicate right of way, the Department will not pave the road. In an effort to keep the road unpaved, the property owners advise that they are not going to sign right of way.</p> <p><b>Solution:</b> See attached letter set out to property owners prior to surveying and drawing road plans. Property owners given opportunity to comment and express their wishes prior to commitment of department resources.</p> <p><b>Results:</b> Less time spent on roads where right of way will not be granted and therefore road will not be paved.</p>	Division 10, District 3	2007	Scott Cole	(704)289-1397	Cycle Time Reduction

Salt Spreader Stands	<p>Problem: Division 10 Bituminous unit had 5 of our salt spreaders sitting on concrete barriers wall. An employee has to climb up the concrete barriers to get on top of the salt spreader unit. Once on top of the spreader, the employee hooks the four-legged chain. Then the employee has to climb down off of the spreaders using the concrete barrier as a stepping stool. After this operation is completed, the boom truck operator or loader operator takes control of the operation. There are two ground guides and a spotter; the spotter directs the truck operator.</p> <p>Solution: Division 10 Bituminous purchased 5 Swenson leg stands. These stands have reduced the number of needed personnel, eased the workload on the crew, eliminated overhead hazards, prevented slips, falls and pinch points and freed up personnel.</p>	Operations Division 10	2007	Chip Speight	(704)782-0714	Labor Hour Savings
New Construction of Oil/Lube Storage Building	<p>Problem: The existing lube storage building was too small to store the required lubes in a safe manner. There was very little mobility or access and there was a risk of injury any time stock movement was required. In addition, spill containment was a challenge.</p> <p>Solution: Employees at the Mt. Pleasant Shop in Division 10 built a larger building for the purpose of storing required lubricants.</p>	Operations Division 10	2007	Ricky Mabry	(704) 596-2131	Safety Improvement
New Shop Entrance	<p>Problem: After the Division Shop was constructed, the shop foreman's office, which is a work bay in the middle of the shop, was added. There was no outside entrance close to this office. Outside department employee traffic was forced to come through the main work area of the shop.</p> <p>Solution: The Charlotte Shop designed, constructed and installed a new shop entrance door. This door provides easy access to the shop foreman's office. Employees do not need to walk through the main work area of the shop.</p>	Operations Division 10	2007	Ricky Mabry	(704) 596-2131	Safety Improvement
Shop Lift Attachment Holders	<p>Problem: The Charlotte Shop has several lifts designed to raise vehicles for service. The lifts use attachments to adapt the lift to different trucks and were always lying around on the floor causing tripping and lifting hazards.</p> <p>Solution: The Charlotte Shop designed, constructed and installed holders for the lift attachments. The holders provide employees easy access to the attachments without having to bend all the way to the floor, or reaching under a bench.</p>	Operations Division 10	2007	Ricky Mabry	(704) 596-2131	Safety Improvement
Storage Building	<p>Problem: The Charlotte Shop has some tools that are seasonal and only used a couple of times per year. These tools were being stored in the rear work bay, making that bay unavailable for other use.</p> <p>Solution: Employees at the Charlotte Shop designed and constructed a new place to store these seasonal tools when not in use. A used Leonard Mobile Unit became available when the old Monroe Shop was decommissioned. This unit was installed outside the main shop area and is equipped to store and organize the seasonal tools and other miscellaneous spare parts.</p>	Operations Division 10	2007	Ricky Mabry	(704) 596-2131	Safety Improvement
Welder Storage	<p>Problem: The Charlotte Shop has a portable welder that is moved around the outside of the shop by forklift, but mostly stays outside the welding bay. Storing the unit outside the welding bay sometimes blocks the door.</p> <p>Solution: Employees at the Charlotte Shop designed and installed a new pad to store the portable welder when not in use. This provides easy access to the welder away from everyday shop traffic.</p>	Operations Division 10	2007	Ricky Mabry	(704) 596-2131	Safety Improvement
Overhead Sign Measurements	<p>Problem: To install the current lane closure signs, several departments and numerous employees had to be involved. The departments involved were: 1) Division Traffic Services signal and signs units; 2) Division Incident Management; 3) Local Police Department; 4) Highway Patrol. All total, 12 to 17 people were involved in the process. Division 10 has been researching ways to install signs on the interstate without having to have someone physically go up in a bucket truck to measure the sign to be installed.</p> <p>Solution: Park a vehicle on the shoulder of the road between employees and the oncoming traffic so that working personnel can extend a grade rod up to the sign structure. Another person can take a picture of the overhead sign along with the grade rod. Total time to accomplish this is less than five minutes. There has also been a reduction of employees involved down to 2 or 3.</p>	Operations Division 10	2007	Tim Kirk	(704) 342-6812.	Safety Improvement

Tailgate Removal Procedures	<p>Problem: In the past, removing tailgates from trucks resulted in injuries such as pinched or scraped hands and fingers, trauma to the head, and bruised or crushed toes and feet.</p> <p>Solution: Employees in Division 10 devised a safer procedure for removing tailgates. It involves the use of hoists, lift slings and D-rings to remove tailgates. The recommended method is as follows:</p> <ol style="list-style-type: none"> <li>1. Attach a lift sling to the tailgate; hook the center ring of lift sling to boom pole then lift boom pole until lift sling in taut.</li> <li>2. Remove pins from the tailgate. Use a fiberglass hammer and pin-removal hammer to remove pin from the tailgate.</li> <li>3. Transport the detached tailgate and place in the storage rack.</li> </ol> <p>The Specification Committee approved that all new dump trucks will be equipped with D-rings to aid in tailgate removal.</p>	Operations Division 10	2007	Darla Burris	(704) 982-0101.	Safety Improvement
Vibratory Plate Tamps	<p>Problem: Many of our small dump trucks have been tied up pulling patch rollers and not available for other operations.</p> <p>Solution: At the yearly equipment buy, I requested plate tamps for each of the patch crews. Each crew was assigned a tamp which is used for most potholes. This would allow unutilized trucks not just sitting on jobs which also improves the unit cost for patching operations</p>	Operations – Division 10	2007	David Gillette	(704) 283-5941.	Labor Hour Savings
Plate Tamp Lift	<p>Problem: The Monroe Maintenance shop of Division 10 uses plate tamps for asphalt operations. These tamps weigh approximately 200 pounds. The tamps would have to be loaded onto the patch trucks by hand, and unloaded by hand when used. Operators complained of back stress due to lifting these heavy tamps.</p> <p>Solution: A truck mount hydraulic lift was designed and installed by the Monroe Shop. One prototype was put into service and tested. All patch crews have since requested these hydraulic lifts and they have been installed on all of the patch trucks in Union County. These lifts have been approved by the Division 10 Safety personnel.</p>	Operations Division 10	2007	Charles Hatley	(704) 283-6242	Safety Improvement
Tar & Gravel Vs. Cold Patch	<p>Problem: When crews could not get asphalt from the plant they were using cold patch material to patch potholes. The cold patch material is very expensive, over double that of regular asphalt.</p> <p>Solution: To minimize the amount of cold patch material used we went back to the old method of hand patching with tar and gravel. The cold patch material is now only used if plant mix is unavailable and conditions will not allow the use of tar and gravel.</p>	Operations- Division 10	2007	David Gillette	(704) 283-5941	Dollar Savings
Earthwork Computation Spreadsheet	<p>Problem: Time and training required to compute earthwork volume for estimated and final quantities to be paid on construction projects.</p> <p>Solution: A spreadsheet was created to enable anyone to enter data from x-section notes or plotted areas. Entry does not require any special training and can be used by anyone. It is helpful in establishing estimated quantities of earthwork throughout a project as well as computing exact final quantities.</p>	Operations - Division 10	2006	Margaret Hough	(704) 394-8314	Labor Hour Savings
Safety Handrails for Sign Erector Trucks	<p>Problem: Division 10 inspects all new equipment prior to utilization for proper safety devices. It was determined that the sign erector truck did not provide for the proper mounting and dismounting at the rear of the vehicle. Employees mounted and dismounted their vehicles using unstable or unsafe means of third point contact.</p> <p>Solution: The installation of additional grab handles to the rear cargo area of the sign truck allows Division 10 Traffic Services to meet Standard Operation Procedures, as well as nationwide safety standards set for mounting and dismounting of equipment.</p>	Operations - Division 10	2006	Donald Griffith	(704) 982-1998	Safety Improvement
TIP Developments	<p>More and more developments are being constructed along TIP corridors before the TIP projects are constructed. When the development and TIP projects fall within City Limits, oftentimes curb and gutter and sidewalk are requirements for the developers to construct. I have had many projects where only preliminary plans have been developed for the TIP projects, and the projects are 5 to 10 years away. In these instances, requiring the developer to construct curb and gutter and sidewalk is useless when it will have to be torn out in the future and replaced at the department's cost.</p>	Operations- Div 10	2004	Matt Weiss	(704)-982-0104	Communications



County Resurfacing History Map	<p>Our office wanted a visual representation of the roads that have been resurfaced over the past years. I used a county map and highlighted the roads for respective years that they were resurfaced. I updated it each fall and I will start to include Moving Ahead and Senate Bill Projects. The pavement condition survey is helpful, however, with the highlighted maps, you can see which roads have been resurfaced and which areas have been concentrated on very easily.</p> <p>I use these maps when reviewing utility encroachment contracts. It allows me to easily review the utility route, and determine if it will be in conflict, or how strict we need to be with utility cuts in the pavement, placing spoil on the roadway, and location of the utility.</p>	Operations- Div 10	2004	Matt Weiss	(704)-982-0104	Communications
Interstate Salt Brine Application Equipment	<p>To allow for pretreatment of Interstates 77 and 85 with brine, two used 5000 gallon chemical tankers with chlorobutyl linings to prevent corrosion were purchased. These units were delivered to the Charlotte Equipment Shop where preventive maintenance was performed on all lighting and brake systems. Each unit was equipped with a hydraulic driven water pump, electrical control valves, spray nozzles, and cab mounted controls. This retrofit allows the operator to choose two or three lanes of coverage from the operator's seat. Two Road Oil Unit road tractors not being used during snow and ice removal were used to pull the tankers. The tankers were also equipped with hoses and valves to allow them to transport brine product from the brine plant to several remote storage locations within Division Ten.</p> <p>Two smaller hydroseeders from the Landscape Unit were used to apply brine on the on/off ramps and overpasses on the interstate routes. The hydroseeders were retrofitted with electrical valves, spray nozzles and cab controls that can spray one or two lanes from controls in the cab.</p>	Operations-Div 10	2004	Rick Mabry	(704) 596-2131.	Customer Service
Hydraulic Hose Machine	<p>The Monroe Shop did not have the equipment to fabricate hydraulic hoses. When needed, the hoses were ordered or purchased from outside vendors.</p> <p>A hydraulic hose crimp machine was purchased for the Monroe Shop, and the fittings and hoses were added to the shop's parts inventory.</p>	Operations-Div 10	2004	Edward Hill	(704) 283-6242.	Customer Service
Road Addition Mapping	<p>Recently we have begun to use aerial photography to aid in our road addition process. Previously, when roads were added to the State system we would sketch the road into our county maps and the accuracy was not as it should. With the help of our CAD operators, they can use aerial maps to outline the roads and print out a much more detailed map that gives the exact location, length and reference to other roads.</p>	Operations-Div 10	2004	Matt Weiss	(704) 982-0104	Cycle Time Reduction
One Man Patcher	<p>After a heavy snow season followed by an unusually wet spring, the roads in the county were in very poor condition with many potholes. We rented a patch machine made by Rossco from Interstate Equipment Co. The machine patches using tar and gravel and is self-contained on a 33,000 GVW truck. The operation requires only one person to operate, and a second if needed to stop traffic when operating in a curve or other blind spots. This operation has patched up to 120 holes in a single day, with 75 to 100 being normal. The single truck was able to patch more holes than all 5 patch crews combined. Each conventional patch crew consisted of 1 TSI, 2 TW, 2 inmates, 1 Crewcab Dump, 1 Tar Kettle, 1 Small Dump, 1 Roller, and 1 Roller Trailer. The use of this machine has not only helped to get potholes under control, but has allowed us to concentrate less on response and more on routine maintenance of roads.</p>	Operations-Div 10	2004	W.D. Gillette	(704) 289-1330	Cycle Time Reduction
Work Instruction Manual for Office Procedures	<p>The Division 10 Equipment Office clerical staff consists of an office manager and three processing assistants each having designated duties to perform. In the absence of an employee, their designated duties are normally put on hold until they return back to work because other employees are not trained in those areas. Also, if a position becomes vacant, all office personnel brainstorm together to figure out the process to carry on those duties. Since there is no formal training for out specific jobs, we felt the need to cross-train all current personnel and come up with a method to train new personnel as well. Implementing and creating a training/work instruction manual has solved this problem.</p> <p>Office personnel and the equipment superintendent have created a detailed manual to include all transactions that are used to perform day-to-day operations in the Division 10 Equipment Unit.</p>	Operations-Div 10	2004	Anne Evans	(704) 596-2131	Cycle Time Reduction
Developer Resurfacing	<p>Due to the large amount of development in Cabarrus County, and with the majority of these developments the developer must construct roadway improvements. To eliminate conflict with our resurfacing contracts, we have determined that if the development is approved, and set for construction before we receive that upcoming year resurfacing list, and the subject development is within limits of our projects, we leave out their proposed improvements from our resurfacing program. By not overlaying their improvements, we can save tenths of miles in resurfacing and add other maps to our contract.</p>	Operations-Div 10	2004	: Matt Weiss	(704) 982-0104	Dollar Savings

Aerial Mapping of Quantities	This process is new so it is difficult to say if the actual quantities installed we be closely related to those that are being estimated. It has, however, decreased the time it takes to get quantities by 50%. Instead of two people spending an entire day collecting measurements, now only one person can complete the project. If the average engineer (TE1) makes \$19/hr then wages not spent on the extra personnel for one day is \$152.00. To perform the investigation requires at least one round trip of approximately 220 miles at \$.25/mile which equals \$55.00 in vehicle costs plus \$16.28 in fuel. The total savings per contract would amount to \$223.28.	Operations-Div 10	2004	Tim Kirk	(704) 982-0101	Dollar Savings
Tailgate Pin Punch	The removal of dump truck tailgate pins often resulted in smashed fingers and hands. In order to prevent this safety hazard, an inexpensive hand tool was created to assist in the removal of the tailgate pins. A simple piece of soft stock steel machined down to the proper diameter and length with a handle attached. A dead blow hammer was used to prevent the metal from shearing.	Operations-Div 10	2004	John Edmonds	(704) 596-6900	Safety Improvement
False Floor	In order to access equipment from the bed of traffic services trucks, it was necessary for operators to keep getting up and down in the back of the truck several times during the workday. Team members in the Division 10 Charlotte Shop designed, constructed and installed a false floor for the bed of their service trucks. Under the floor is a spot for signs, poles, and any hardware needed to install and repair signs. The truck operators now have easy access to the equipment.	Operations-Div 10	2004	Robert Waterhouse	(704) 596-2123	Safety Improvement
Parts Truck Modification	Personnel in the Division 10 Newell Parts Department discovered that the parts delivery truck needed stronger sides as well as a stronger headboard in the box part of the truck. They installed plywood and handrails to the sides of the box interior to secure the parts being transported daily to the shops within Division 10.	Operations-Div 10	2004	Jonathan Rinehardt	(704) 596-2123	Safety Improvement
Containment Area for Fuel Truck	In the past, there was no containment area for possible fuel or lube spills from the fuel truck. The Anson Shop personnel in Division 10, with the help of the Department of Corrections, constructed a covered parking area for the Anson Shop fuel truck. This area also provides a containment wall in the event of a fuel or lube spill from the fuel truck.	Operations-Div 10	2004	Eugene Cash	(704) 694-2636	Safety Improvement
Use of Nextels to Communicate with the Contractor	There has always been a problem in communicating with the contractor on a project. This problem existed at different levels. At times the head project inspector has a hard time locating and communicating with the project superintendent. Likewise, the DOT engineer frequently has a hard time reaching a project manager/engineer from the contractor. The contractor on the project was using the Nextel radio to communicate with each other. Our office had a possible solution to the problem. We asked the contractor if a couple of Nextel radios could be donated to our office for the duration of the project. One Nextel radio went to the Assistant Resident Engineer on the project, the other went to the head project inspector.	OPERATIONS - DIVISION 10	2002	Brady McKenzie	(704) 289-1330.	Communications
Access Sign In/Out Program	Administrative Support staff was unable to accurately identify office staff signed in and out of the office. To remedy the problem they followed the following steps: Develop and implement Access Sign In/Out Program. Load program on office PCs in start up menu for employees to use and update. Macro ensures accurate information updating in seconds. Each employee's name is alphabetized on the spreadsheet, which includes the office phone extensions. There are columns for Out Time and In Time, Day Left and Day Returning and Location which contain drop down menus which record time and allow the options for Meeting, Lunch, Sick, Annual Leave, etc. However, any reason can be typed in the Location column. Once all information is entered, the employee hits the Save and Refresh button. This action updates the spreadsheet for all employees running the active window.	OPERATIONS - DIVISION 10	2002	Cynthia Doby	(704) 982-0101.	Communications
NCDOT Division of Highways Design-Build	Our office is currently administering a one-of-a-kind project. It is an alternative contracting method known as Design/Build, and is the first of its kind under the 1998 Design/Build legislation in the state of North Carolina. Interstate 77, which currently carries 73,000 cars per day on four lanes, is being widened from two to four lanes in each direction for approximately 8.9 miles from I-85 to just north of the proposed Charlotte Outer Loop in Mecklenburg County. A highway project such as this would traditionally take about two and a half years with the construction lasting for about three years. The highway project would, therefore, normally take about five and a half years to complete. However, under Design/Build, the team has committed to open all lanes to traffic by December 2003 and was able to begin construction on December 3, 2001, which means a little more than two years under construction.	OPERATIONS - DIVISION 10	2002	Leslie Reynolds	(704) 982-0101.	Customer Service

Lift Cable Tool	services packages and mechanic service packages, the lift cables are often found to be defective. In the past when these cables were replaced it was very difficult to obtain the correct tension on the new cable. This would often lead to premature cable failure due to cable backlash. Also, at best, it took two mechanics to install the lift cable. The Monroe Shop Team came up with a solution to this problem. A cable tension tool was designed and built. This tool hooks to the rear of the vehicle and the new cable is routed through it, when the cable is wound on the crane lift drum, it has the correct tension on it.	OPERATIONS - DIVISION 10	2002	Charles Hatley	(704) 283-6242.	Customer Service
Flip Detour Signs	Division 10 Traffic Services installs detour signs as needed for construction. In the past, the signs were covered until they became effective. The problem would occur when weather would blow the covers off in which the sign would then have to be recovered by Traffic Services or the department they were installed for. Other problems occurred when the detour was completed and Traffic Services wasn't informed. Traffic Services developed a sign that flips by installing a hinge in the middle of the sign. This way the sign could be folded up to display the wording or folded down to cover the wording. By using this method, one person could stand on the ground and fold the sign up or down very easily. A latch was used at the top of sign to hold it in place.	OPERATIONS - DIVISION 10	2002	Mike Campbell	(704) 982-0101.	Cycle Time Reduction
PM Box	In the past, when a mechanic was to perform a preventive maintenance on a vehicle or equipment, he would go to the parts counter for the needed filters and parts and this could sometimes be time consuming. A new process was implemented to reduce the mechanic's time waiting for parts. Upon calling the parts department, personnel place the needed filters into a box with the equipment number on it.	OPERATIONS - DIVISION 10	2002	Keith Smith	(704) 596-2131	Cycle Time Reduction
US Mailbox	The Division 10 Equipment Shop and the District 2 Office/Newell Maintenance facility had separate PO Box rentals. On a daily basis when mail was picked up, each location had mail that belonged to one another delaying that facility in getting mail on time. Due to a busy work schedule, mail was not always picked up in a timely manner and would cause hardships. The post office was the mailing address and mail would be returned to the vendor due to an insufficient address since the Division was not set up to receive mail at the physical address. Also on one occasion, an employee went to pick up the mail and pulled out in flowing traffic and was hit by another vehicle crossing over a railroad track at a very dangerous intersection. Fortunately, the employee was not injured which could have led to thousands of dollars being spent on a workers comp claim. The post office was contacted for details on how to install a US mailbox.	OPERATIONS - DIVISION 10	2002	Anne Evans	(704) 596-2131	Cycle Time Reduction
Hydraulic Hose Fabrication	In the past, most hydraulic hoses, as well as fittings, were purchased from outside vendors. This process was expensive, as well as, time consuming. The Albemarle equipment shop decided it was time to change this process. A hydraulic hose crimp machine was added as well as a 10x14 room addition to the shop.	OPERATIONS - DIVISION 10	2002	Melvin Furr	(704) 982-1997	Dollar Savings
Replacement of Steel Plank Floor on a 150-ft. Span Bridge	Bridge Maintenance is responsible for a variety of structure maintenance activities. One type of maintenance performed several times a year is the replacement of steel plank flooring or rehabilitation on bridge structures. To reduce bridge closing for these repairs a new method of replacement was used. Instead of air hammers and muscle a Skid Steer Loader with an impact tool attachment is used. This allowed for a two-week reduction in the bridge closing (from 6 weeks to 4) and a reduction of required labor from 6 workers to four workers.	OPERATIONS - DIVISION 10	2002	Terry Harris	(704) 982-0101.	Dollar Savings
"Staking with Ease"	There are various problems associated with staking by pine-wood materials: 1) the material is heavy and cumbersome and must be sorted and placed within limited confines of the survey vehicle; 2) the control stakes require attaching flagging that when placed in pastures, cattle and/or horses frequently ingest the vinyl material torn from the stakes; 3) repeat handling is necessary because all the stakes are written up at once, then sequentially loaded into the vehicle and distributed on site at required locations; 4) stakes must be driven into sometimes hard, dry, or even frozen ground by a 10 or 12 pound sledge hammer which is a potential risk factor; and 5) wooden stakes have a short duration period and re-staking is necessary. A new process utilizing wire stakes secured with a vinyl flag was implemented by the survey stakeout time in Division 10. They weigh less than four pounds each and can be easily placed with a wire flag tool. This eliminates repeat handling of bulky, heavy wooden materials and no prior distribution or laying-out on site is necessary.	OPERATIONS DIVISION 10	2001	Ronald Posey	(704) 982-0104	Labor Hour Savings

Equipment/Personnel Complement	<p>After budget review meetings with Division &amp; District Engineers, we were instructed to review personnel &amp; equipment complements &amp; determine areas that could be cut to allow for budget savings. After reviewing information regarding the equipment usage based on fuel consumption for the past year, we were able to reduce our complement by 7 pieces of equipment for a cost saving of \$3308.50/pp or \$86,021.00/yr budget savings. All equipment had reached its maximum depreciation except for a Thermolay Patch Truck that was transferred to another unit that was in need of this.</p> <p>The complement of crew cab trucks was reduced from 9 to 7 allowing 1 spare. Crews are required to be multifunctional throughout the day and the Thermolay was not cost effective. The grader was the oldest and used basically as a spare. Due to the infrequency of snow and the reduction of dirt road miles in the county, the cost savings far exceeded the need for the spare grader. The other pieces of equipment were removed due to their condition or lack of use. No equipment was turned in that would have a negative impact on our operations.</p>	OPERATIONS DIVISION 10	2001	Janice Bobo	(704) 982-0104	Dollar Savings
Bridge Timber Disposal	<p>When demolishing structures in the past, several miles had to be driven to a demolition dumpsite and pay for disposal. In the past months, a different approach to disposing of materials that are not salvageable began. The old timbers and non-useable materials are now being offered to local property owners free of charge if they sign an agreement to allow DOT Bridge Maintenance to dump the materials on their property. DOT is saving money due to the following factors: 1) Material is only handled one time in loading saving in labor and time. 2) Saving on the average of \$26 - \$40 per ton on disposal fees. 3) Dumping locally saving on labor and mileage. 4) Speeding up the project by having a quick turnaround on the trucks and are using less trucks for hauling.</p>	OPERATIONS DIVISION 10	2001	Garland Haywood	(704) 982-3720	Dollar Savings